



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-28-Apr-20

CORRIGENDUM- 02

PROJECT	:	3x800 MW PVINL PATRATU TPP PHASE-1
PACKAGE	:	FUEL OIL HANDLING AND STORAGE SYSTEM
ENQUIRY NO	:	PE/PG/PA1/E-6419/2020 Dated. 08.04.2020
SUBJECT	:	PRE- BID CLARIFICATION

Type of Corrigendum			
Technical Corrigendum -	☒	Commercial Corrigendum -	☐

In reference to the above mentioned tender enquiry for **FUEL OIL HANDLING AND STORAGE SYSTEM** package

Please note the following.

1. All bidders are requested to go through the attached pre bid clarification for their kind consideration.

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

Yours faithfully,

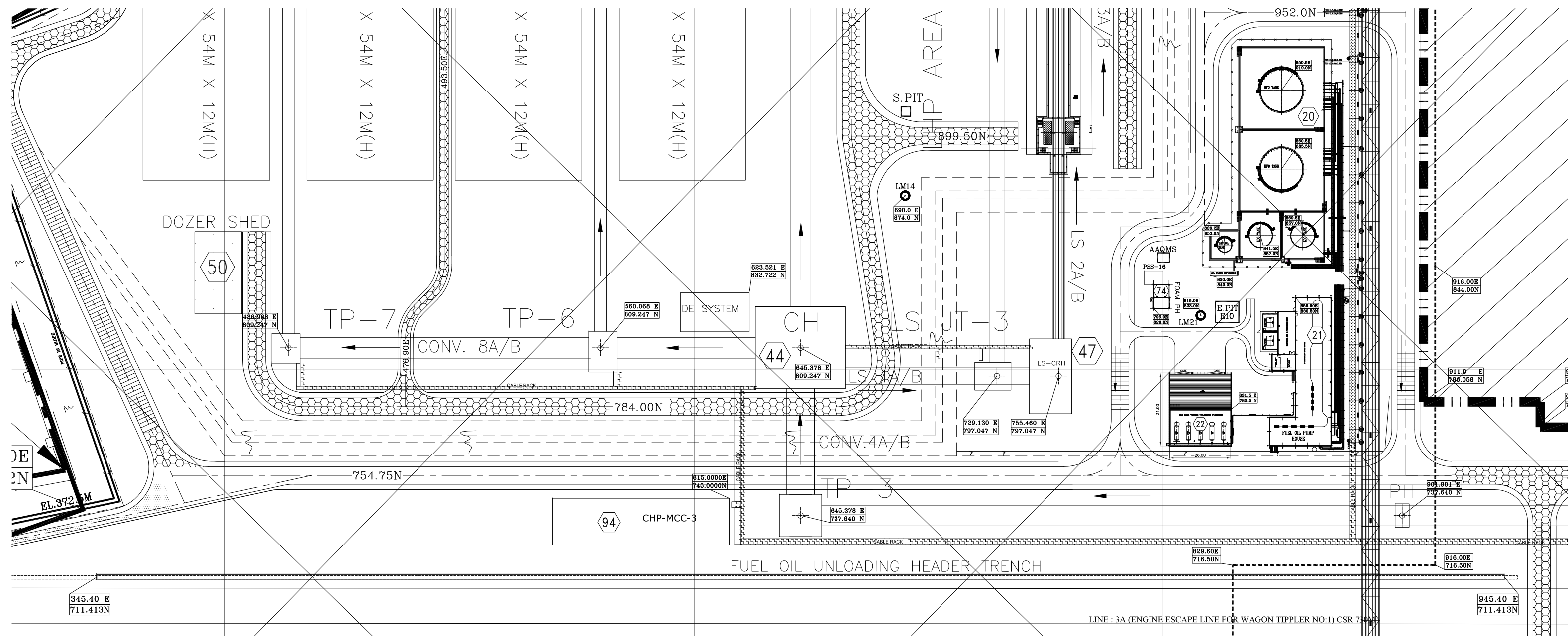
For and on behalf of BHEL

Guru Das
Dy. Manager

PRE BID CLARIFICATION SCHEDULE				
Project:	3 x 800MW PVUNL PATRATU TPP PHASE-1			
Package:	FUEL OIL UNLOADING AND STORAGE SYSTEM			
Sr.No.	Section/Clause/ Page No.	Statement of the referred clause	Clarification/ Confirm action required	BHEL REPLY
A	Mechanical			
1	P&ID for HFO, LDO and Steam & condensate system, Drg. No. PE-DG-434-166-A001, Rev.00 / Page no. 343 to 347 of 606. Piping layout in & around storage tank farm area, Drg.no. PE-DG-434-166-A004 Piping layout of unloading pump house, Drg.no. PE-DG-434-166-A004	Refer pipe sizes in the P&ID's and Piping layouts	Sizes of following lines shown in the P&ID's are contradicting with the sizes indicated in the Piping Layout drawings. HFO rail wagon unloading header Suction & discharge headers of HFO unloading pumps HFO supply line to pressurizing pumps HFO inter tank transfer line HFO return line from Boiler LDO supply line to pressurizing pumps LDO inter tank transfer line Aux. steam header to tank farm area & etc. However we consider the sizes given in the piping layout drawings are final as the layout drawings are prepared recently than P&ID's. Please confirm. We understood that BHEL has provided older P&ID's and request to provide latest P&ID's inline with the piping layouts.	Bidder to follow Piping layout and attached PID.
2	P&ID for HFO & LDO system, Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 02 of 06. / Page no. 343 of 606.	Regarding the location of suction line tapping on unloading header	From the P&ID we understood that tapping for suction line of HFO unloading pumps shall be taken from the mid length of the unloading header and not from the nearest point on the unloading header from the unloading pump house. Please confirm.	Tapping for suction line of HFO unloading pumps shall not be taken from the mid length of the unloading header. In piping layout of unloading pump house (page no. 355/606) , entry of suction header has been shown. Same shall be extended upto unloading header. Please refer plot plan.
3	Plot plan, Drg. No. PE-DG-434-100-M001 / Page no. 359 of 606.	---	As the size of the plot plan is very high, it's been taking lot of time and experiencing difficulty in navigating between the facilities of FO system in the plot plan of the entire plant. Hence we request to provide plot plan that contains only the facilities of FO system.	Bidder to follow Plot plan provided with specification ,extract of plot plan is attached.
4	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 49 of 606 / Ci. No. 1.03.00	The receiving yard shall be designed to unload one (1) full rake of 76 no's/48 nos. railway wagons at a time. The oil from railway wagons shall be unloaded to unloading header by gravity which shall then be pumped to storage tanks through unloading pumps.	Please provide the length of each railway wagon and exact no. of wagons to be unloaded at once for calculating the length of the wagon unloading header.	50 no. BTPN wagon to be considered as per PID.
5	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 49 of 606 / Ci. No. 1.05.00	Each rail wagon (TOH type) for HFO/LSHS/HPS shall have steam heating arrangement for heating of HFO to 50 deg. C, LSHS to 70 deg. C and HPS to 85 deg. C for free flowing of the oil. Bulk heating will be performed by the serpentine heater at the bottom of wagons. For heating purposes, steam shall be provided by Bidder.	Please provide capacity of wagons and number of wagons to be heated at one time for calculating the steam consumption. Please specify the initial temperatures of wagons for each type of fuel. Please provide total time required for heating and unloading of wagons.	Total steam requiremnt is 27 T/hr . Same is indicated in clause No.4.0.0 TERMINAL POINT page no. 37 of 606.
6	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 51 of 606 / Ci. No. 2.01.03	d) Eighty (80) nos. of 75 NB neoprene rubbers flexible hoses each of 8000 mm length with coupling & fitting for connecting to wagons for fuel oil unloading. The hoses shall be provided with universal type of couplings for connecting to wagon outlet flanges.	Quantity of HFO oil unloading hoses specified in the referred clause is contradicting with the quantity shown in the P&ID for HFO system. Please clarify.	Bidder to follow PID.
7	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 51 of 606 / Ci. No. 2.01.03	(e) 50 NB flexible hoses each of 8000 mm length with coupling & fitting for connecting to wagons. Eighty (80) nos. hoses will be supplied for steam service and eighty (80) nos. for condensate service. The hoses shall be provided with universal type of couplings for connecting to wagon outlet flanges.	Following details given in the referred clause is contradicting with the P&ID for steam & condensate system. Please clarify. Size of the steam hoses. Quantity of condensate hoses.	50 NB flexible hoses each of 8000 mm length with coupling & fitting for connecting to wagons. Eighty (80) nos. hoses will be supplied for steam service and eighty (80) nos. for condensate service. The hoses shall be provided with universal type of couplings for connecting to wagon outlet flanges.
8	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 18 & 20 of 606 / Oil characteristics	--	Densities of HFO, LSHS, HSP & LDO oils are not mentioned in the oil characteristics datasheet. Please provide.	Density of fuel oil is as below:- 1. HFO- 950-975 Kg/m3. 2. LSHS -925 Kg/m3. 3.HPS -855 Kg/m3. 4.LDO -855-875 Kg/m3 above value are tentative.
9	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 32 of 606 / Clause. No. 1.1.0 - 8	Two (2) (1W+1S) nos. LDO transfer pump motor set each of capacity 25 cum/hr. with twin simplex type strainers of matching capacity at the suction of each pump.	Referred specification calls for twin simplex strainers to be provided in the each suction of LDO transfer pumps, where as in the P&ID for LDO system (Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 04 of 06) only two no's simplex strainers are indicated in the common suction of two LDO transfer pumps. Please clarify the actual requirement.	Bidder to follow PID.
10	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 33 of 606 / Clause. No. 1.1.0 - 22 SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 33 of 606 / Clause. No. 1.1.0 - 25	Complete Fuel oil piping including steam tracing, drain piping, vent piping, valves, insulation & cladding (for restricting heat loss and maintaining outside temp below 60 deg. C) etc. as applicable to Fuel oil unloading & storage system. Pipes will be free issued to bidder for Fuel oil handling system package. However, flanges, fasteners, gaskets, supports, pipe trestle within dyke and pump house as required etc. as applicable within the terminal point will be in vendor scope.	From the referred clauses we understood that all pipes including pipes required for HFO, LDO, Steam & condensate, drain oil system and steam tracers are free issued by BHEL. Please confirm.	Confirmed.
11	P&ID for Steam & Condensate system, Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 05 of 06 / Page no. 346 of 606.	Notes: 2. Steam traps for suction heater & floor coil heater of storage tank shall be of IB type. All other steam traps shall be TD type.	As most of the approved vendors are regretting to quote IB type steam traps for high flow rates. However we propose ball float type steam trap instead of IB type. Please confirm. Also provide specification/datasheets for steam traps.	Bidder to follow technical specification.
12	P&ID for HFO & LDO system, Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 02 & 04 of 06. / Page no. 343 & 345 of 606.	Terminal points for HFO & LDO Pressurizing pumps supply future connection.	We presume terminal point for future connection is also 1000mm from Pressurizing pump house. Please confirm.	Bidder to refer PID.
13	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 33 of 606 / Ci. 1.1.0 SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 51 of 602 / Ci.2.01.02	19)Two (2) nos. (1W+1S) sump pump motor set in of capacity 10 m3/hr. in unloading header trench. 20) Two (2) nos. (1W+1S) sump pump motor set in of capacity 10 m3/hr. in unloading area drain trench. 21)Two (2) nos. (1W+1S) sump pump motor set in of capacity 10 m3/hr. in unloading Pump House. (g) Two (2) no's sump pumps of capacity 10 cu.m/hr each at the sump in HFO unloading pump house complete with all accessories of drive and mounting as specified.	As per referred BHEL specification, bidders scope includes supply of Two (2) nos. (1W+1S) sump pumps (of 10m³/hr capacity) each in unloading header trench, unloading area drain trench & unloading Pump House. But customer specification calls for supply of only (2) nos. (1W+1S) of 10m³/hr capacity sump pumps in unloading pump house. Please clarify the actual requirement. If the bidders scope includes supply of sump pumps in unloading header trench and unloading area drain trench sump pits. Please	Bidder to follow BHEL specification.
14	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 32 of 606 / Ci. 1.1.0	15) Flow gauge and Coriolis type mass flow meter in HFO and LDO discharge header.	We understood that Flow gauge mentioned in the referred clause is nothing but sight flow indicator without any flow measurement. If not, please provide the specifications for flow gauge.	Flow gauge suitable for oil measurement shall be provided. Other detail shall be finalized during detail engineering.

15	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 37 of 606 / Cl. No. 4.0.0 Terminal points	Effluent from Oil Water Separators: Water pit of OWS. Further, pumps and piping up to CMB be under ETP scope.	We understood that instruments and valves associated with the water pit of OWS and piping of sump pumps (BHEL scope) installed on water pit.	Bidder to refer PID.
	P&ID for HFO system, Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 02 of 06	Oil water separation pit - water pit		
16	P&ID for Steam & Condensate system, Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 05 of 06.	Notes: 4. Shell surface of F.O storage tanks shall be insulated.	Please clarify whether complete shell to be insulated or partially. If partially insulated, provide the height to be considered.	Full tank shell to be insulated.
17	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 36 of 606 / Cl.No. 4.0.0	Terminal points	Kindly provide terminal points for condensate, PRDS spray water, and instrument air. Also provide the flow rate & temperature of spray water being available at terminal point.	Terminal point shall be near tank farm area within 10m. Tentative parameters to be considered as operating temperature ~ 59.8 deg C (Design temperature: 60 deg C). Other parameter shall be provided during detail engineering. Bidder to refer PID.
18	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 64 of 606 / Cl.No. 5.01.10 P&ID for HFO, LDO and Steam & Condensate system, Drg. No. PE-DG-434-166-A001, Rev.00.	Velocity criteria Pipe sizes	Velocity criteria are provided in the technical specification for calculating the pipe sizes. However we understood that pipe sizes mentioned in the P&ID's are minimum requirement. Please clarify.	Bidder to follow PID.
19	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 57 & 58 of 606 / Cl.No. 3.00.00	Painting specification	In the referred clause, painting specification for uninsulated piping is not given. Hence we are considering painting specification applicable for External surface of uninsulated tanks for the same. Please confirm.	Bidder to follow painting specification attached in section - IA. Painting is subject to customer approval and same shall be provided without any cost implication to BHEL.
20	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 50 of 606 / Cl.No. 2.01.01	(c) One (1) number day oil tank for auxiliary boiler of capacity 100 cu.m for storage of LDO. The tank shall be located in the vicinity of the auxiliary boiler.	Referred clause says that LDO day oil tank shall be located in the vicinity of the auxiliary boiler. But in the plot plan provided, the same is located near Fuel oil tank farm area. Please clarify.	Bidder to follow plot plan.
21	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 360 of 606 / LIST OF MANDATORY SPARES FOR FUEL OIL	Regarding Spare quantities	1. Spare quantities of following items given in the spare list are the requirement intended for each equipment or for each type & rating of equipment. - Strainer elements - Relief valve complete assembly - Bearings - Rotor Assembly (Complete cartridge assembly) - Mechanical seal Assembly (if applicable) - Control valves 2. In the given spare list, strainer element & mechanical seal assembly are being asked for unloading cum transfer pumps as spares. We consider the same only for unloading pumps not for transfer pumps which are not in our scope.	1.Specification requirement is clear, bidder to follow specification 2. Bidder to provide spares as per scope mentioned in technical specification.
22	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 78 of 606 / AMENDMENT NO. 1 TO TECHNICAL SPECIFICATION (SECTION VI)	Regarding the type of drain oil transfer pumps in the drain oil tank.	From the referred amendment sl.no.8, we understood that BHEL envisaging common building for Fuel Oil Unloading and Fuel Oil Pressurizing system with a common DOT of 10m3 capacity. According to this amendment, type of drain oil pumps shall be Rotary, positive displacement, horizontal pumps fitted with relief valves, which is contradicting with the type of drain oil pumps (Single screw vertical) given in the pumps specification given in pg.68 of 606. Please confirm type of pumps to be considered for drain oil pumps.	Bidder to follow specification.
B	Electrical, Control & Instrumentation			
1	SPECIFICATION NO. PE-TS-434-166-A001 / Section IA / Page 36 of 606	i) Exclusion as indicated in Electrical & C&I portion of technical specification	We have not found any exclusions relevant to electrical and C&I scope in respective specifications. Please provide.	Bidder to follow specification.
2	TECHNICAL SPECIFICATIONS, SECTION VI, PART-B, BID DOC. NO.:cs-9585-001-2, SUB SECTION A-21, FO-UNLOADING SYSTEM, Cl. No: 11.00.00, PAGE 70 OF 606. TECHNICAL SPECIFICATIONS SECTION VI, PART-B, SUB-SECTION - A-13, THERMAL INSULATION, Page 238 of 606	9. Pipe Insulation a) Rock wool Mattress 100 kg/cu.m. b) Glass wool Mattress 64 kg/cu.m. c) Mineral wool Preformed Pipe Section 140-150 kg/cu.m. 2.01.00 Insulation Materials : Type # 2:Piping system & equipment with operating temp. in range of 60- 400 deg.C Type # 3:Piping system of 350 NB and below with temp. in range of 60 – 500 degC Type # 4: Piping system of 350 NB and below with operating temp. in range of 60-400 deg.C	Particular type of material (preformed sections or LRB Mattresses) to be considered for Thermal Insulation is not given in the referred specifications. Hence we are considering LRB mattresses with 100Kg/M3 density. Please confirm.	Bidder to follow specification.Other detail shall be finalized during detail engineering.
3	TECHNICAL SPECIFICATIONS, SECTION VI, PART-B, BID DOC. NO.:cs-9585-001-2, SUB SECTION A-21, FO-UNLOADING SYSTEM, Cl. No: 11.00.00, PAGE 71 OF 606. TECHNICAL SPECIFICATIONS SECTION VI, PART-B, SUB-SECTION - A-13, THERMAL INSULATION, Page 239 of 606	14. Hexagonal wire mesh, Up Galvanized steel of 10-13 mm to 400 deg. C aperture and 0.71 mm diameter 5. Hexagonal wire mesh: Wire mesh netting shall be 10 to 13 mm aperture at least 0.56mm diameter wire.	Both referred clauses are contradicting regarding wire diameter. However we are considering as cl.No 11.00.00, page No. 71 of 606. (10-13mm & 0.71mm dia wire). Please confirm.	Detail mentioned in "TECHNICAL SPECIFICATIONS, SECTION VI, PART-B, BID DOC. NO.:cs-9585-001-2, SUB SECTION A-21, FO-UNLOADING SYSTEM, Cl. No: 11.00.00, PAGE 71 OF 606." shall prevail.
4	TECHNICAL SPECIFICATIONS, SECTION VI, PART-B, BID DOC. NO.:cs-9585-001-2, SUB SECTION A-21, FO-UNLOADING SYSTEM, Cl. No: 11.00.00, PAGE 71 OF 606. TECHNICAL SPECIFICATIONS SECTION VI, PART-B, SUB-SECTION - A-13, THERMAL INSULATION, Page 239 of 606.	11. Sheathing (cladding) material As per ASTM B-209-1060 TEMPER-H-14 (or) As per IS 737 Gr.19000/H2. a) For a dia of insulated surface of 450mm and above for flat surfaces - 16 SWG with lightly Bonded Mattress b) For a dia of insulated surfaces up to 450 mm - 20 SWG with lightly Bonded Mattress c) For a dia of insulated surfaces up to 450 mm - 20 SWG (with Preformed Pipe Sections) 2.02.00 Cladding Material & Accessories shall be as specified here under. Cladding - Aluminum ASTM B-209-1060 temper H14 or IS:737 Gr.19000/H2 Thickness of sheathing: (a) 18SWG (1.219mm) for diameter for insulated surface 450 mm and above and for flat surfaces (b) 20 SWG (0.91 mm) for diameter of insulated surface 150 mm and above up to 450 mm. (c) 22 SWG (0.71 mm) for diameter of insulated surface 150 mm and below. (d) 16 SWG ribbed Aluminum for Steam Generator outer casing	Cladding material thicknesses details given under the referred clauses are contradicting each other. However we are considering as cl.No 11.00.00, page No. 71 of 606. Please confirm.	Detail mentionmed in "TECHNICAL SPECIFICATIONS, SECTION VI, PART-B, BID DOC. NO.:cs-9585-001-2, SUB SECTION A-21, FO-UNLOADING SYSTEM, Cl. No: 11.00.00, PAGE 71 OF 606".shall prevail.
5	Process & Instrumentation Diagram for HFO System Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 02 of 06.	Regarding insulation thicknesses	In the referred P&IDs all pipe line is provided with 50mm insulation thickness in the pipe nomenclature. Whereas based on the temperatures & pipe sizes and service the insulation thicknesses will change. Please clarify whether we have to proceed as per our sizing calculations or as per P&ID.	Insulation thickness shall be as per calculation.

6	SECTION-C, C & I TECHNICAL SPECIFICATION FOR DCS BASED FUEL OIL UNLOADING & STORAGE SYSTEM Page 440 of 606	19) Redundancy of sensors shall be provided by bidder (i) Triple redundancy for all analog and binary inputs required for protection of the system/drives. (ii) For all other control functions dual redundancy of the sensors shall be provided by the bidder.	As per referred clause triple redundancy required for protection of system/drive and dual redundancy is required for all other control functions. Whereas in the give P&IDs you have indicated dual redundancy for all the instruments which protects the drives by tripping and one DPT for each strainer. Triple redundancy shown for TT for controlling of PRDS, floor coil and suction heaters. Being high value involved in instrumentation, we request you to clarify whether we have to follow PIDs or referred clause.	Specification requirement is clear, bidder to follow specification. Bidder to note that the quality shown in P&ID is the minimum requirement. During detail engineering if any additional instruments are required for the safe & reliable operation of plant, bidder shall supply the same without any price/delivery implication.
	Process & Instrumentation Diagram for HFO System & Steam and condensate Drg. No. PE-DG-434-166-A001, Rev.00, Sht. 02 & 06 of 06.	For redundancy		
7	SECTION-C, C & I TECHNICAL SPECIFICATION FOR DCS BASED FUEL OIL UNLOADING & STORAGE SYSTEM, SPECIFIC TECHNICAL REQUIREMENTS (C&I) WITH SCOPE OF SUPPLY, Page 440 of 606	20) The PDBs (in bidders scope) provided for distribution of UPS loads shall be as per following guidelines. Each PDB shall be provided with input feeder monitoring through potential free contact wired to DCS. The output feeders from the PDB shall be provided with separate fuse & MCB's. 10% spare feeders (min. 1 no.) with MCB & fuses for each rating shall be provided in Bidder's each PDB.	As there is no UPS, UPS ACDB or DCDBs involved in our scope, this clause is not applicable. Please confirm.	The specification requirement is clear. The purpose of this clause is that if any power is required for Equipment/instrument supplied by bidder, BHEL will provide the power at single point. Further distribution is in bidder's scope.
8	SECTION-C, C & I TECHNICAL SPECIFICATION FOR DCS BASED FUEL OIL UNLOADING & STORAGE SYSTEM Page 440 of 606	22) Bidder shall provide Ultrasonic/Radar type level transmitters depending upon the functional suitability for different sumps which is also subject acceptance by NTPC.	Please clarify which type of level transmitter we need to consider.	Specification requirement is clear, bidder to follow specification.
9	SECTION-C, C & I TECHNICAL SPECIFICATION FOR DCS BASED FUEL OIL UNLOADING & STORAGE SYSTEM Page 463 of 606	SPECIFICATIONS FOR PR. GAUGE, D.P. GAUGE, TEMP. GAUGE AND LEVEL GAUGE. Temperature gauge	In the referred specification calls for capillary only for temperature gauges. For pressure measurements (i.e., gauges, switches & transmitters) there is no capillary indicated. Please clarify whether capillary is required or not. If so please provide length of the capillary to be considered.	Specification requirement is clear, bidder to follow specification. The accessories required and not mentioned specifically shall also be in the scope of Bidder.
10	SECTION-C, C & I TECHNICAL SPECIFICATION FOR DCS BASED FUEL OIL UNLOADING & STORAGE SYSTEM/CONTROL VALVES, ACTUATORS & ACCESSORIES/ Cl. No. 7.00.00/ Page 481 of 606	11) Hand Held Hart Calibrator: Universal Hart Calibrator to be provided (for quantity, refer Part-A: Contract quantities of the specification).	Referred Part-A: contract quantities of the specifications is not found in the tender document. Please provide.	Universal Hand Held Calibrator is not in bidder's scope. However, all the transmitters (as applicable) supplied by bidder should have provision for calibration by Universal Hand Held Calibrator.



COMPUTER FILE NAME: PE-DG-434-166-A101

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Fold-4

PE-DG-434-166-A101

DRAWING No.

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3

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5

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Fold-2

7

Fold-2

8

Fold-1

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Fold-1

10

Fold-1

11

CUSTOMER'S DRAWING No.

LEGEND

SYMBOL	DESCRIPTION
	HOSE
	HFO PIPE WITH INSULATED & STEAM TRACED
	COIL HEATER
	PUMP
	LOCAL DRAIN
	MOTOR
	LIMIT SWITCH
	PRESSURE INDICATOR
	PRESSURE TRANSMITTER
	DIFFERENTIAL PRESSURE INDICATOR TRANSMITER
	FLOW METER (CORIOLIS TYPE)
	FLOW GAUGE
	LEVEL TRANSMITTER(RADAR/ULTRASONIC TYPE)
	LEVEL INDICATOR
	LEVEL SWITCH
	TEMPERATURE INDICATOR
	TEMPERATURE ELEMENT + TEMPERATURE TRANSMITTER
	SIGNAL TO DCS
	STEAM TRAP
	SIMPLEX STRAINER
	STEAM CONTROL VALVE
	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	RELIEF VALVE
	REDUCER/EXPENDER

PIPE NOMENALATURE

350	HFO	3	50
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INSULATION THICKNESS (IN MM)

NO. OF STEAM TRACERS

SERVICE FLUID

PIPE SIZE IN NB

KKS NOMENALATURE

9	ENC	10	AA	001
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Instrument number key

Equipment/Instrument Key

Area key

Function key

Unit number identifier

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
2	9ENR10BB001	OIL WATER SEPARATOR TANK	1
3	9ENC11AP001, 9ENC12AP001, 9ENC13AP001, 9ENC14AP001, 9ENC15AP001	HFO UNLOADING PUMPS	5
4	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002, 9ENC14AT001, 9ENC14AT002, 9ENC15AT001, 9ENC15AT002	HFO SUCTION STRAINER	10
5	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
6	9ENB10AH001, 9ENB11AH001, 9ENB20AH001	FLOOR COIL HEATER	3
7	9ENR10AP001, 9ENR10AP002	OIL RECOVERY PUMP (OWS)	2
8	9ENB30AP001, 9ENB30AP002	HFO U/L P/H SUMP PUMP	2
9	ENB31AP001, ENB31AP002, ENB32AP001, ENB32AP002	U/L HEADER TRENCH AND DRAIN TRENCH SUMP PUMP	4

MOC OF OIL PIPE: API-5L GR. B ERW

PIPE SIZE	OUTSIDE DIA (MM)	THICKNESS (MM)
15NB	21.34	2.77
20NB	26.67	2.87
25NB	33.40	3.38
40NB	48.26	3.68
50NB	60.32	3.91
100/80/65NB	114.3/ 88.30/ 73.20	3.96
150NB	168.27	4.78
250/200NB	273.05/ 219.07	5.56
350/300NB	355.60/ 323.85	6.35
400NB	406.40	7.14
450/500NB	457/508	7.14
450NB AND ABOVE SIZE PIPE CAN BE 8.0MM PLATE FABRICATED.		
STEAM/CONDENSATE LINE: ASTM 106 GR. B, STD / 40 SCH.		

NOTES:

1. PUMP HEAD SHALL BE AS PER CALCULATION.

2. ALL VALVES SHOULD BE LOCATED AT GRADE/MAN APPROACHABLE LEVEL.

3. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY AS PER LAYOUT REQUIREMENT.

4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.

5. ALL HFO LINES, DRAIN OIL LINES, PUMPS, STRAINER, HFO TANKS, DRAIN OIL AND TANKS ARE STEAM TRACED. HFO PUMP AND STRAINER SHALL BE STEAM JACKETED.

6. ALL HFO LINES SHALL BE STEAM TRACED AS FOLLOWS:-

S.NO.	HFO LINE SIZE	NO. OF TRACERS	TRACER LINE SIZE
1	100 NB AND BELOW	1	20NB
2	150NB TO 300NB	2	20NB
3	350NB AND ABOVE	3	20NB

7. ALL DRAIN & VENT VALVES ARE IN NORMALLY CLOSE CONDITION.

8. SIZE OF INLET AND OUTLET SPARE CONNECTIONS SHALL BE SAME AS INLET AND OUTLET NOZZLES.

9. ALL VALVES USED IN OIL LINES SHALL BE FIRE SAFE.

10. ALL HFO, STEAM AND CONDENSATE LINES/EQUIPMENTS SHALL BE INSULATED.

11. COUNTER FLANGES WITH FASTENER & GASKETS AT TERMINAL POINT WILL BE SUPPLY BY VENDER.

12. DRAIN OIL TANK SHALL BE INSULATED.

13. THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C&I.

434

CONTRACT

DISTRIBUTION

TO									
No. OF									
REV.	DATE	ALTD	CHD	APPD					

NTPC DRG No.

9585-001-130-PVM-L-001

CUSTOMER

NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)

PACKAGE:

FUEL OIL UNLOADING AND STORAGE SYSTEM.

PROJECT:-

3x800 MW Patratu Super Thermal Power Station
Expansion Phase-I

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
DRN	SC	Sd/-		04.02.2019
DESN	SC/RG	Sd/-		04.02.2019
CHD	HK	Sd/-		04.02.2019
APPD	SKB	Sd/-		04.02.2019

TITLE

PROCESS & INSTRUMENTAION DIAGRAM FOR HFO SYSTEM

							DEPT.	SCALE	DRAWING No.	
							SIGN		PE-DG-434-166-A001	
							DATE		SHEET 01 OF 06	REV 00

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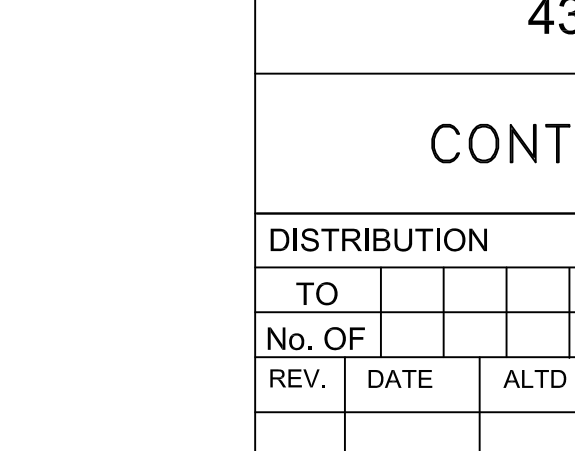
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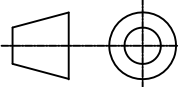
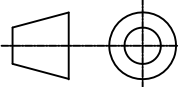
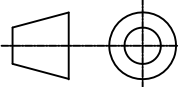
352 of 602

Fold-1

SIZE-A1

TENDER DRAWING



NTPC DRG No. 9585-001-130-PVM-L-001																																								
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)																																							
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.																																							
PROJECT: - 3x800 MW Patratu Super Thermal Power Station Expansion Phase-I																																								
 BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.	<table border="1"> <tr> <th>DEPT CODE</th> <th>NAME</th> <th>SIGN</th> <th>DATE</th> </tr> <tr> <td rowspan="4">M</td> <td>DRN SC</td> <td>S4/-</td> <td>04.02.2019</td> </tr> <tr> <td>DESN SC/RG</td> <td>S4/-</td> <td>04.02.2019</td> </tr> <tr> <td>CHD HK</td> <td>S4/-</td> <td>04.02.2019</td> </tr> <tr> <td>APPD SKB</td> <td>S4/-</td> <td>04.02.2019</td> </tr> </table>	DEPT CODE	NAME	SIGN	DATE	M	DRN SC	S4/-	04.02.2019	DESN SC/RG	S4/-	04.02.2019	CHD HK	S4/-	04.02.2019	APPD SKB	S4/-	04.02.2019																						
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COMPUTER FILE NAME: PE-DG-434-166-A102

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PE-DG-434-166-A102

DRAWING No.

Fold-3

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Fold-3

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CUSTOMER'S DRAWING No.

LEGEND

SYMBOL	DESCRIPTION
	HOSE
	LDO PIPE LINE
	PUMP
	LOCAL DRAIN
	MOTOR
	LIMIT SWITCH
	PRESSURE INDICATOR
	PRESSURE TRANSMITTER
	DIFFERENTIAL PRESSURE INDICATOR TRANSMITER
	FLOW METER (CORIOLIS TYPE)
	FLOW GAUGE
	LEVEL TRANSMITTER(RADAR/ULTRASONIC TYPE)
	LEVEL INDICATOR
	LEVEL SWITCH
	SIGNAL TO DCS
	SIMPLEX STRAINER
	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	RELIEF VALVE
	REDUCER/EXPENDER

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9EGB10BB001, 9EGB11BB001	LDO STORAGE TANK	2
2	9EGC11AP001, 9EGC12AP001	LDO UNLOADING PUMPS	2
3	9EGC11AT001, 9EGC11AT002, 9EGC12AT001, 9EGC12AT002, 9EGC31AT001, 9EGC31AT002	SUCTION STRAINER	6
4	9EGB12BB001	LDO DAY OIL TANK	1
5	9EGC31AP001, 9EGC31AP002	LDO TRANSFER PUMPS	2

KKS NOMENALATURE

9	ENC	10	AA	001
---	-----	----	----	-----

INSTRUMENT NUMBER KEY

EQUIPMENT/INSTRUMENT KEY

AREA KEY

FUNCTION KEY

UNIT NUMBER IDENTIFIER

PIPE NOMENALATURE

XXX	XXX	XXX	XXX
-----	-----	-----	-----

INSULATION THICKNESS (IN MM)

NO. OF STEAM TRACERS

SERVICE FLUID

PIPE SIZE IN NB

VALVE SELECTION CRITERIA FOR FUEL LINE:

300NB & BELOW: BALL/ PLUG VALVE	50 NB & ABOVE: SWING CHECK VALVE,
ABOVE 300NB: GATE VALVE	BELOW 50NB: LIFT CHECK VALVE

NOTES:

1. ALL VALVES SHOULD BE LOCATED AT GRADE/MAN APPROACHABLE LEVEL.

2. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY.

3. HIGHER SIZE HAS BEEN PROVIDED BASED ON PIPE SIZING CRITERIA AND AS PER TENDER DRG.

4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.

5. ALL DRAIN & VENT VALVES ARE IN NORMALLY CLOSE CONDITION.

6. THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C&I.

434

CONTRACT

DISTRIBUTION

TO								
No. OF								
REV.	DATE	ALTD	CHD	APPD				

NTPC DRG No.

9585-001-130-PVM-L-001

CUSTOMER

NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)

PACKAGE:

FUEL OIL UNLOADING AND STORAGE SYSTEM.

PROJECT:-

3x800 MW Patratu Super Thermal Power Station
Expansion Phase-I

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
DRN	SC	Sd/-		04.02.2019
DESN	SC/RG	Sd/-		04.02.2019
CHD	HK	Sd/-		04.02.2019
APPD	SKB	Sd/-		04.02.2019

TITLE

PROCESS & INSTRUMENTAION DIAGRAM FOR LDO SYSTEM

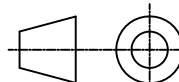
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							SIGN		PE-DG-434-166-A001
							DATE		SHEET 03 OF 06 REV 00

TENDER DRAWING

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SIZE-A1



NTPC DRG No.		9585-001-130-PVM-L-001							
CUSTOMER		NTPC Limited (A GOVT. OF INDIA ENTERPRISE)							
PACKAGE:		FUEL OIL UNLOADING AND STORAGE SYSTEM.							
PROJECT: – 3x800 MW Patratu Super Thermal Power Station Expansion Phase-I									
 BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.		DEPT CODE M	NAME	SIGN	DATE				
			DRN	SC	Sd/-	04.02.2019			
			DESN	SC/RG	Sd/-	04.02.2019			
			CHD	HK	Sd/-	04.02.2019			
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TITLE PROCESS & INSTRUMENTAION DIAGRAM FOR LDO SYSTEM									
						DEPT.	SCALE		
						SIGN			
						DATE			
						DRAWING No.			
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						SHEET 04 OF 06		REV00	

COMPUTER FILE NAME: PE-DG-434-166-A101

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Fold-3

FIRST ANGLE PROJECTION

Fold-2

ALL DIMENSIONS ARE IN MM

Fold-1

PE-DG-434-166-A101
DRAWING NO.

CUSTOMER'S DRAWING NO.

LEGEND

SYMBOL	D E S C R I P T I O N
----	STEAM LINE WITH INSULATION
~~~~	HOSE
●-●-●-●	CONDENSATE LINE WITH INSULATION
≡≡≡	INSTRUMENT AIR LINE
————	DM WATER LINE
---Z---	COIL HEATER
∕∕∕∕∕∕	HEATING COIL
↓	LOCAL DRAIN
ⓉⓈ	TEMPERATURE ELEMENT + TEMPERATURE TRANSMITTER
Ⓣ	TEMPERATURE INDICATOR
Ⓟ	PRESSURE INDICATOR
ⓅⓈ	PRESSURE TRANSMITTER
ⓉⓈ	TEMPERATURE ELEMENT
◇	SIGNAL TO DCS
⌞T⌞	TRAP WITH INBUILT STRAINER
○	SIMPLEX STRAINER
⌞	Y-TYPE STRAINER
CS	CONTROL STATION
⋈/⋈	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
⋈/⋈	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
⋈/⋈	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
⋈/⋈	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
⌞	NON RETURN VALVE
⌞	PRESSURE RELIEF VALVE
⌞	DISC CHECK VALVE
⌞	CONTROL VALVE
ⓈⓈ	SMART POSITIONER
▷	REDUCER/EXPENDER

EQUIPMENTS DETAIL:—

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
3	9ENB20BB001	DRAIN OIL TANK	1
4	9ENC11AP001, 9ENC12AP001, 9ENC13AP001	HFO UNLOADING PUMPS	3
5	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002	HFO SUCTION STRAINER	6
6	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
7	9ENB10AH001, 9ENB11AH001, 9ENR10AH001	FLOOR COIL HEATER	3

EQUIPMENTS DETAIL:—

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
2	9ENR10BB001	OIL WATER SEPARATOR TANK	1
3	9ENC11AP001, 9ENC12AP001, 9ENC13AP001, 9ENC14AP001, 9ENC15AP001	HFO UNLOADING PUMPS	5
4	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002, 9ENC14AT001, 9ENC14AT002, 9ENC15AT001, 9ENC15AT002	HFO SUCTION STRAINER	10
5	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
6	9ENB10AH001, 9ENB11AH001	FLOOR COIL HEATER	2
7	9ENR10AP001, 9ENR10AP002	OWS SUMP PUMPS	2
8	9ENB30AP001, 9ENB30AP002	HFO U/L P/H SUMP PUMP	2
9	ENB31AP001, ENB31AP002, ENB32AP001, ENB32AP002	U/L HEADER TRENCH AND DRAIN TRENCH SUMP PUMP	4

NOTES:

- ALL STEAM/CONDENSATE LINES SHALL BE INSULATED.
- STEAM TRAPS FOR SUCTION HEATER & FLOOR COIL HEATER OF STORAGE TANKS SHALL BE OF IB TYPE. ALL OTHER STEAM TRAPS SHALL BE OF TD TYPE.
- FOR STEAM LINES & TRACER LINES, TRAPS SHALL BE PROVIDED AT EVERY 30 TO 35 MTR.
- SHELL SURFACE OF F.O. STORAGE TANKS SHALL BE INSULATED.
- PIPE SIZES FOR ALL STEAM LINES, TRACER LINES, CONTROL STATIONS, CONDENSATE LINES ETC. SHALL BE PROVIDED AS PER APPROVED CALCULATION.
- ALL CONTROL VALVES SHALL BE PROVIDED WITH ISOLATION VALVES AND WITH A DRAIN VALVE IN UPSTREAM AND DOWNSTREAM.
- DELETED.
- DELETED
- MODULATING TYPE CONTROL VALVE FOR FLOOR COIL HEATER AND SUCTION HEATER SHALL BE PROVIDED.
- INSTRUMENTS SHALL BE PROVIDED AS PER P&ID.
- DRAIN FROM FLASH TANK SHALL BE DISCHARGED TO OIL WATER SEPARATOR.
- DELETED.
- THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C&I.

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Fold-4

E

F

TENDER DRAWING

PIPE NOMENALATURE			
350	HFO	3	50

- INSULATION THICKNESS (IN MM)
- NO. OF STEAM TRACERS
- SERVICE FLUID
- PIPE SIZE IN NB

KKS NOMENALATURE				
9	ENC	10	AA	001

- Instrument number key
- Equipment/Instrument Key
- Area key
- Function key
- Unit number identifier

NTPC DRG No.

9585-001-130-PVM-L-001

CUSTOMER

NTPC Limited  
(A GOVT. OF INDIA ENTERPRISE)

PACKAGE:

FUEL OIL UNLOADING AND STORAGE SYSTEM.

PROJECT: — **3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**



BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE  
M

	NAME	SIGN	DATE
DRN	SC	Sd/-	04.02.2019
DESN	SC/RG	Sd/-	04.02.2019
CHD	HK	Sd/-	04.02.2019
APPD	SKB	Sd/-	04.02.2019

TITLE  
PROCESS & INSTRUMENTATION DIAGRAM FOR STEAM AND CONDENSATE SYSTEM

DRAWING No.

PE-DG-434-166-A103

SHEET 05 OF 06

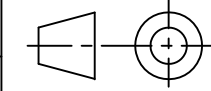
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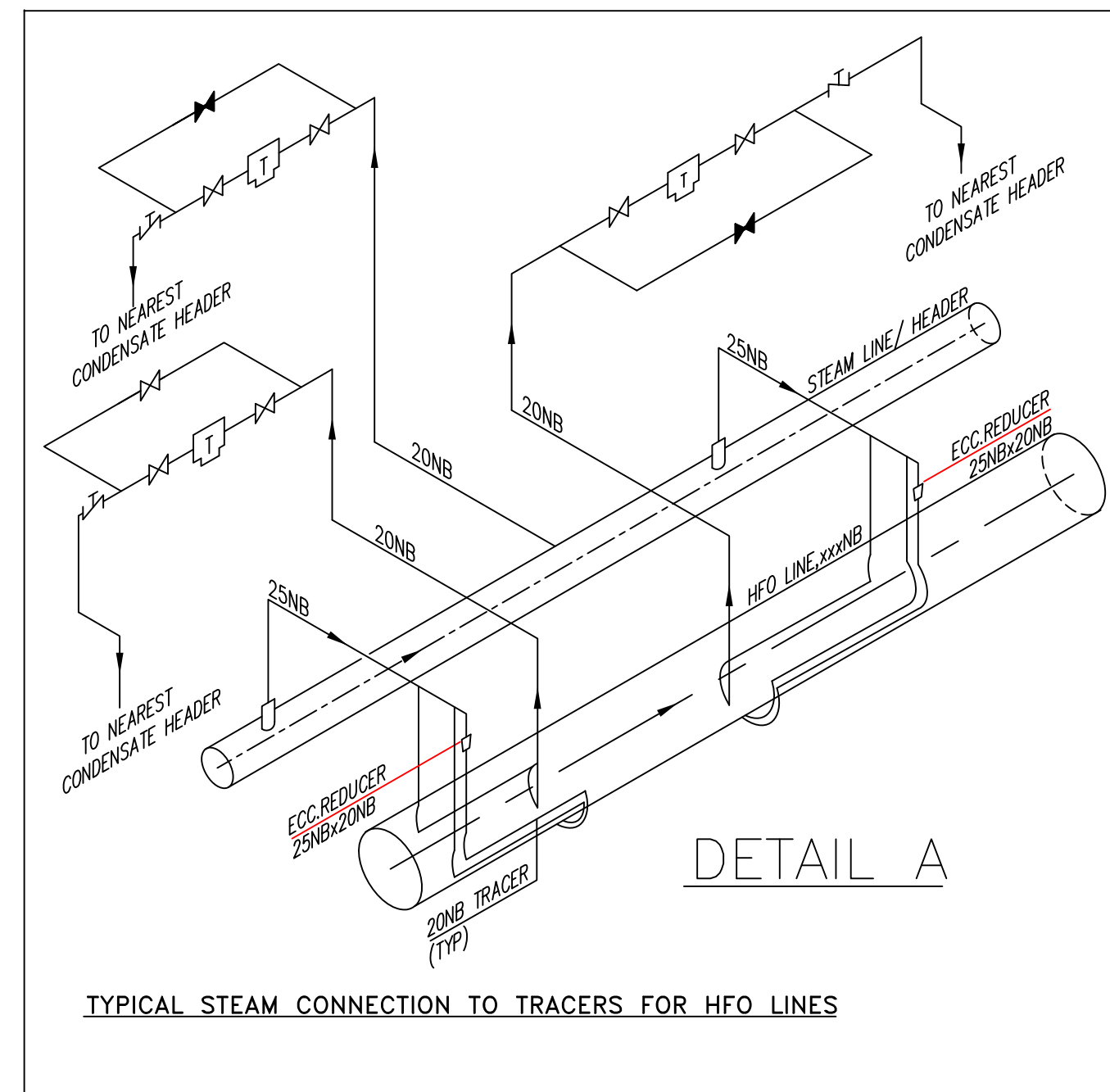
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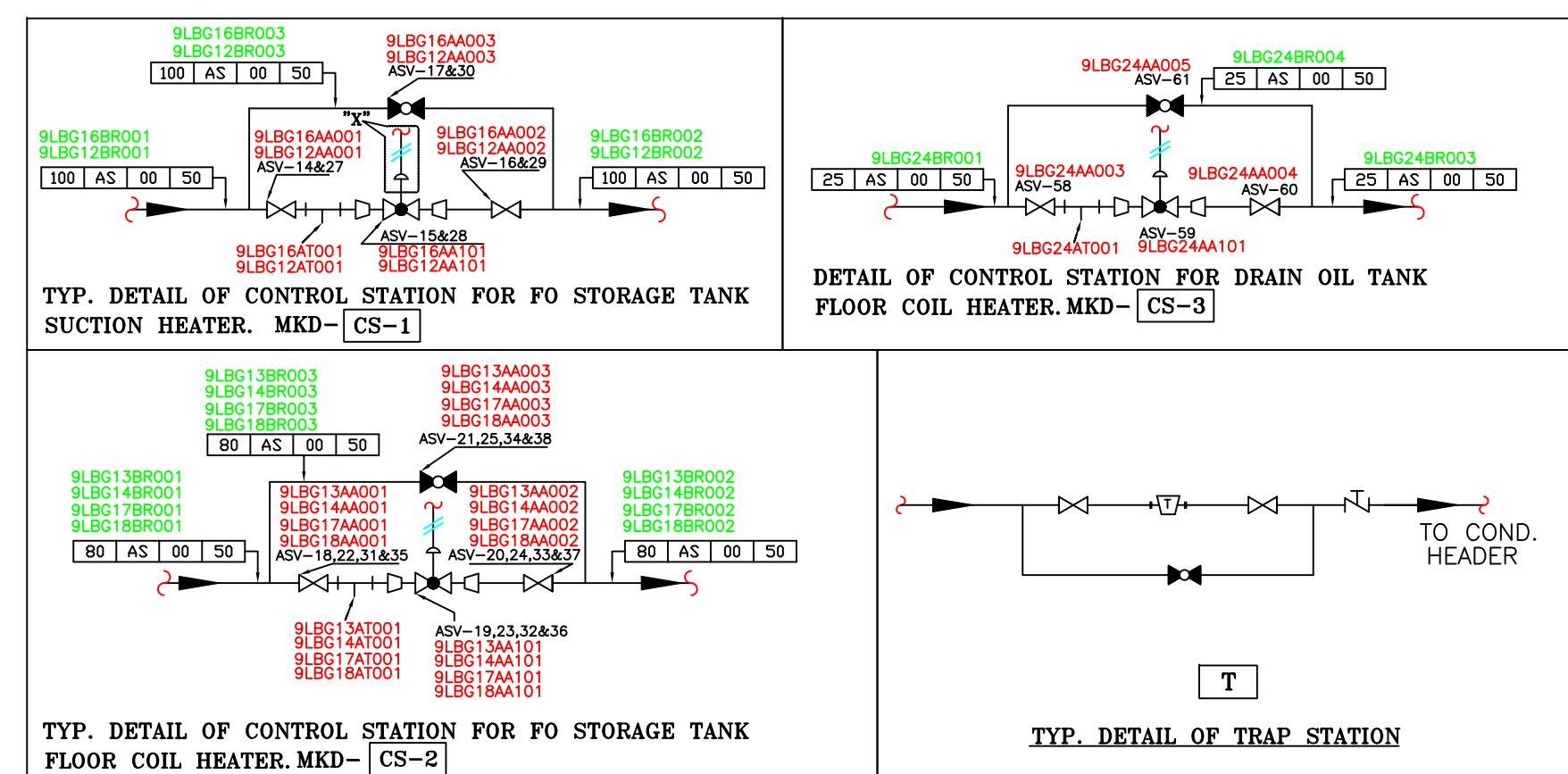
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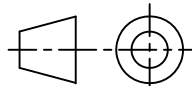




### TYPICAL STEAM CONNECTION TO TRACERS FOR HFO LINES



TENDER DRAWING

NTPC DRG No.		9585-001-130-PVM-L-001			
CUSTOMER		NTPC Limited (A GOVT. OF INDIA ENTERPRISE)			
PACKAGE:		FUEL OIL UNLOADING AND STORAGE SYSTEM.			
PROJECT: -		3x800 MW Patratu Super Thermal Power Station Expansion Phase-I			
 BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.		DEPT CODE  M	NAME DRN SC DESN SC/RGS CHD HK APPD PK	SIGN Sd/- Sd/- Sd/- Sd/-	DATE 04.02.2019 04.02.2019 04.02.2019 04.02.2019
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PROCESS & INSTRUMENTATION DIAGRAM FOR STEAM AND CONDENSATE SYSTEM					
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		DATE		SHEET 06 OF 06	
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